

**Listing of Claims:**

1-11. (canceled)

12. (currently amended) A solder joint for a semiconductor apparatus assembly, wherein the assembly has at least one copper connection site, the solder joint comprising:

the at least one copper connection site having a top surface substantially free of solder material;

a nickel layer on the at least one copper connection site, contacting the top surface;

a copper layer atop ~~the at least one~~ and in contact with the nickel layer; and

a solder ball ~~[[coupled to]]~~ contacting the copper layer forming a bond.

13. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the bond comprises  $\text{Cu}_6\text{Sn}_5$ .

14. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the nickel layer ~~comprises nickel having~~ has a thickness of greater than about 1 micron.

15. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the nickel layer ~~comprises nickel having~~ has a thickness of less than about 5 microns.

16. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the nickel layer ~~comprises nickel having~~ has a thickness within a range of between approximately 1 micron and approximately 5 microns.

17. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the copper layer ~~comprises copper having~~ has a thickness of greater than about 0.6 micron.

18. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the copper layer ~~comprises copper having~~ has a thickness of less than about 6 microns.

19. (currently amended) ~~[[A]]~~ The solder joint according to claim 12 wherein the copper layer ~~comprises copper having~~ has a thickness within a range of between approximately 0.6 micron and approximately 6 microns.

20. (currently amended) A BGA device, comprising:
- a ~~[[board]]~~ substrate having a plurality of metallized connection sites;
  - each site having a flat top surface portion substantially free of solder material;
  - a nickel layer on ~~[[a]]~~ the plurality of the metallized connection sites, contacting the top surface of the sites;
  - a copper layer atop ~~a plurality of~~ and in contact with the nickel layers; and
  - a solder ball ~~coupled to~~ contacting the copper layer forming a bond.
21. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the bond comprises  $\text{Cu}_6\text{Sn}_5$ .
22. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the nickel layer ~~comprises nickel having~~ has a thickness of greater than about 1 micron.
23. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the nickel layer ~~comprises nickel having~~ has a thickness of less than about 5 microns.
24. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the nickel layer ~~comprises nickel having~~ has a thickness within a range of between approximately 1 micron and approximately 5 microns.
25. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the copper layer ~~comprises copper having~~ has a thickness of greater than about 0.6 micron.
26. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the copper layer ~~comprises copper having~~ has a thickness of less than about 6 microns.
27. (currently amended) ~~[[A]]~~ The BGA device according to claim 20 wherein the copper layer ~~comprises copper having~~ has a thickness within a range of between approximately 0.6 micron and approximately 6 microns.
28. (new) A semiconductor apparatus, comprising:
- at least one connection site having a metallic and flat top surface portion substantially free of solder material;

a barrier metal layer on the at least one connection site, contacting the top surface and substantially conforming to the contour of the top surface;

a copper layer in contact with the barrier metal layer, substantially conforming to the contour of the nickel layer; and

a solder ball contacting the copper layer forming a bond.

29. (new) The solder joint of claim 28, in which the bond comprises  $\text{Cu}_6\text{Sn}_5$ .

30. (new) The solder joint of claim 28, in which the barrier layer is nickel.

31. (new) The solder joint of claim 30, in which the nickel layer is operable to keep the metal from the top surface of the connection site from contacting and reacting with the solder ball.